Subungual Onycholemmal Cyst of the Toenail Mimicking Subungual Melanoma

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PRACTICE **POINTS**

- Trauma to the nail may occur years before the development of subungual onycholemmal cysts or it may not be recalled at all.
- Diagnosis requires a degree of clinical suspicion and a nail bed biopsy.
- Subungual onycholemmal cysts must be distinguished from slowly growing malignant tumors of the nail bed epithelium.

This report highlights a rare case of a woman with horizontal ridging and tenderness of the right great toenail associated with dyspigmentation of 5 years' duration. Histopathology revealed a cystic structure with an epithelial lining mostly reminiscent of an isthmus-catagen cyst admixed with the presence of both an intermittent, focal granular layer and an eosinophilic cuticle surrounding pink, laminated keratin, most consistent with a diagnosis of subungual onycholemmal cyst (SOC). It is a rare and distinctive nail abnormality occurring in the dermis of the nail bed. We present a case of an SOC in the toenail mimicking subungual malignant melanoma, which may be an underrecognized and common entity that must be considered when discussing tumors of the nail unit, especially subungual melanoma.

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The authors report no conflict of interest.
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Case Report

A 23-year-old woman presented with a horizontal split along the midline of the right great toenail associated with some tenderness of 2 to 3 months' duration. Approximately 5 years prior, she noticed a bluish-colored area under the nail that had been steadily increasing in size. She denied a history of trauma, drainage, or bleeding. There was no history of other nail abnormalities. Her medications and personal, family, and social history were noncontributory.

Physical examination of the right great toenail revealed a horizontal split of the nail plate with a bluish hue visible under the nail plate (Figure 1A). The remaining toenails and fingernails were normal. A punch biopsy of the nail bed was performed with a presumptive clinical diagnosis of subungual melanoma versus melanocytic nevus versus cyst (Figure 1B). Nail plate avulsion revealed a blackened nail bed dotted with areas of bluish color and a red friable nodule present focally. Upon further inspection, extension was apparent into the distal matrix.

Histopathologic examination revealed a cystic structure with an epithelial lining mostly reminiscent of an isthmus catagen cyst admixed with the presence of both an intermittent focal granular layer and an eosinophilic cuticle surrounding pink laminated keratin, most consistent with a diagnosis

of subungual onycholemmal cyst (SOC)(Figure 2). A reexcision was performed with removal of half of the nail bed, including a portion of the distal matrix extending inferiorly to the bone. Variably sized, epithelium-lined, keratin-filled cystic structures emanated from the nail bed epithelium. There were foci of hemorrhage and granulation tissue secondary to cyst rupture (Figure 3). The defect healed by secondary intention. No clinical evidence of recurrence was seen at 6-month follow-up.

Comment

Subungual onycholemmal cysts, also known as subungual epidermoid cysts or subungual epidermoid inclusions, are rare and distinctive nail abnormalities occurring in the dermis of the nail bed. We present a case of an SOC in a toenail mimicking subungual malignant melanoma.

Originally described by Samman[1] in 1959, SOCs were attributed to trauma to the nail with resultant implantation of the epidermis into the deeper tissue. Lewin[2,3] examined 90 postmortem fingernail and nail bed samples and found 8 subungual epidermoid cysts associated with clubbing of the fingernails. He postulated that the early pathogenesis of clubbing involved dermal fibroblast proliferation in the nail bed, leading to sequestration of nail bed epithelium into the dermis with resultant cyst formation. Microscopic subungual cysts also were identified in normal-appearing nails without evidence of trauma, thought to have arisen from the tips of the nail bed rete ridges by a process of bulbous proliferation rather than sequestration. These findings in normal nails suggest that SOCs may represent a more common entity than previously recognized.

It is imperative to recognize the presence of nail unit tumors early because of the risk for permanent nail plate dystrophy and the possibility of a malignant tumor.[4,5] Subungual onycholemmal cysts may present with a wide spectrum of clinical findings including marked subungual hyperkeratosis, onychodystrophy, ridging, nail bed pigmentation, clubbing, thickening, or less often a normal-appearing nail. Based on reported cases, several trends are evident. Although nail dystrophy is most often asymptomatic, pain is not uncommon.[5,6] It most commonly involves single digits, predominantly thumbs and great toenails.[7,8] This predilection suggests that trauma or other local factors may be involved in its pathogenesis. Of note, trauma to the nail may occur years before the development of the lesions or it may not be recalled at all.

Diagnosis requires a degree of clinical suspicion and a nail bed biopsy with partial or total nail plate avulsion to visualize the pathologic portion of the nail bed. Because surgical intervention may lead to

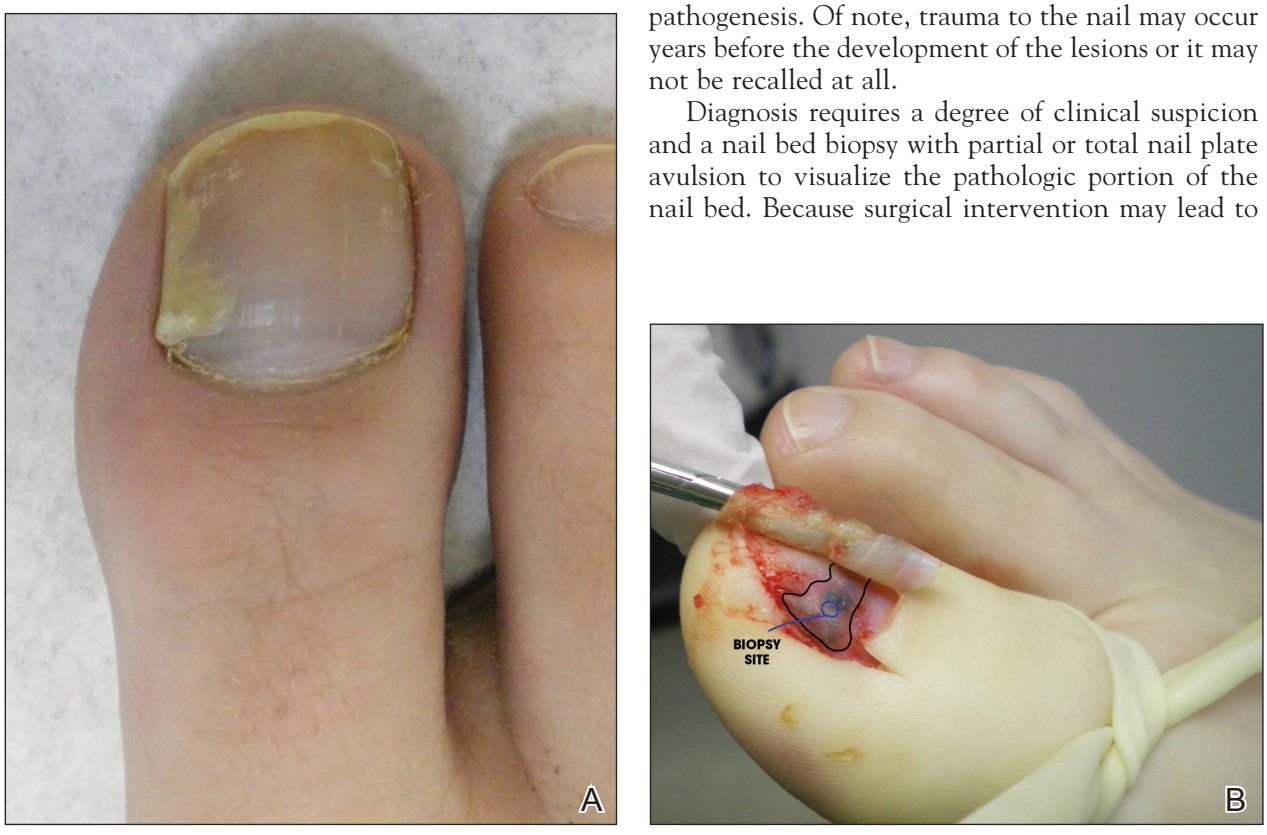

Figure 1. Subungual pressure-induced onycholysis overlying bluish discoloration of the lateral third of the right great toenail. The proximal and lateral nail folds were unaffected (A). A 4-mm punch biopsy site was visible on the nail bed following partial nail avulsion (B).

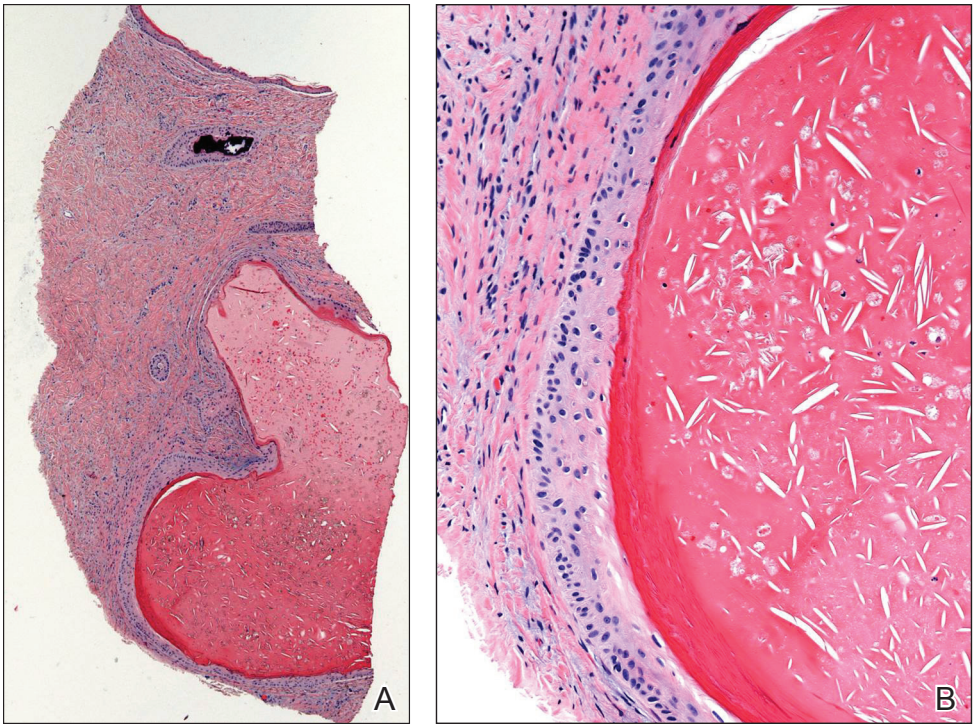

Figure 2. Histopathology revealed a cystic structure with an epithelial lining with an intermittent focal granular layer and eosinophilic cuticle surrounding pink laminated keratin, most consistent with a diagnosis of a subungual onycholemmal cyst (A and B).

the implantation of epithelium, recurrences after nail biopsy or excision may occur.

In contrast to epidermal inclusion cysts arising in the skin, most SOCs do not have a granular layer.[9] Hair and nails represent analogous differentiation products of the ectoderm. The nail matrix is homologous to portions of the hair matrix, while the nail bed epithelium is comparable to the outer root sheath of the hair follicle.[7] Subungual onycholemmal cysts originate from the nail bed epithelium, which keratinizes in the absence of a granular layer, similar to the follicular isthmus outer root sheath. Thus, SOCs are comparable to the outer root sheath–derived isthmus-catagen cysts because of their abrupt central keratinization.[8]

Subungual onycholemmal cysts also must be distinguished from slowly growing malignant tumors of the nail bed epithelium, referred to as onycholemmal carcinomas by Alessi et al.[10] This entity characteristically presents in elderly patients as a slowly growing, circumscribed, subungual discoloration that may ulcerate, destroying the nail apparatus and penetrating the phalangeal bone. On histopathology, it is characterized by small cysts filled with eosinophilic keratin devoid of a granular layer and lined by atypical squamous epithelium accompanied by solid nests and strands of atypical keratinocytes within the dermis.[11] When a cystic component and clear cells predominate, the designation of malignant proliferating onycholemmal cyst has been applied.

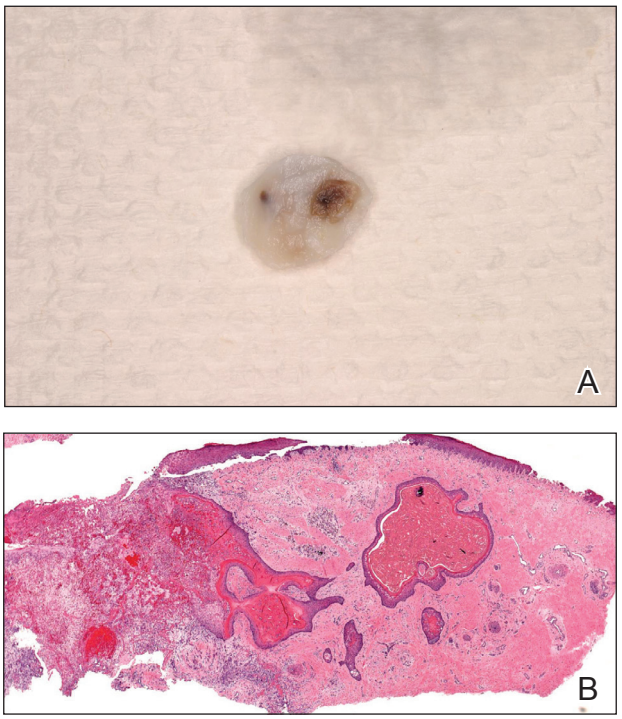

Figure 3. The gross specimen after reexcision revealed multiple foci of hemorrhage and brown keratinaceous material (A). Scanning magnification revealed variably sized, epithelium-lined, keratin-filled cystic structures emanating from the nail bed epithelium containing foci of calcification. There was hemorrhage and granulation tissue secondary to cyst rupture (B)(H&E, original magnification ×20).

Its infiltrative growth pattern with destruction of the underlying bone makes it an important entity to exclude when considering the differential diagnosis of tumors of the nail bed.

Subungual melanomas comprise only 1% to 3% of malignant melanomas and 85% are initially misdiagnosed due to their rarity and nonspecific variable presentation. Aside from clinical evidence of Hutchinson sign in the early stages in almost all cases, accurate diagnosis of subungual melanoma and differentiation from SOCs relies on histopathology. A biopsy is necessary to make the diagnosis, but even microscopic findings may be nonspecific during the early stages.

Conclusion

We report a case of a 23-year-old woman with horizontal ridging and tenderness of the right great toenail associated with pigmentation of 5 years' duration due to an SOC. The etiology of these subungual cysts, with or without nail abnormalities, still remains unclear. Its predilection for the thumbs and great toenails suggests that trauma or other local factors may be involved in its pathogenesis. Because of the rarity of this entity, there are no guidelines for surgical treatment. Subungual onycholemmal cysts may be an underrecognized and more common entity that must be considered when discussing tumors of the nail unit.

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